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EXAMINER	
BEHNCKE, CHRISTINE M	
ART UNIT	PAPER NUMBER
3661	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

Office Action Summary	Application No.	Applicant(s)	
	10/734,616	KURZWEIL, RAYMOND C.	
	Examiner	Art Unit	
	CHRISTINE BEHNCKE	3661	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 June 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This office action is in response to the Amendment and Remarks filed 6/28/2010, in which claims 1-21 were presented for examination.

Response to Arguments

Applicant's arguments with respect to claims 1-4 and 13-15 have been considered but are moot in view of the new ground(s) of rejection. Applicant contends the applied references do not describe or make obvious "a body suit" but merely describe where actuators are placed directly on the user or merely a body exoskeleton. This argument is moot in view of the newly applied reference Tremblay, see the rejection below. With regard to Applicant's assertion that the Rosenberg body exoskeleton is a sensor and does not "reflect back to the user through the exoskeleton" (Remarks page 3), the Examiner disagrees. "In addition to sending out a position vector, the FREFLEX [exoskeleton] controller receives as input a Cartesian force vector representing the magnitude and direction of the force to be applied to the user at the hand grip." (page 123, section 5.3.2.) With regard to Applicant's contention that while Rosenberg does describe computer-generated virtual fixtures, this is "merely a possible concept" (Remarks page 3), the Examiner disagrees. Further chapters, as referred to in the rejection, detail the testing of the virtual fixtures and thoroughly detail the toolbox software of virtual fixture elements available for the user to select and use. The software package to demonstrate the virtual fixtures is thoroughly discussed and presented in Chapter 7 of the thesis beginning on page 170.

Remarks regarding the separately rejected dependent claims 5-12 and 16-21 merely repeat the arguments as applied to claims 1 and 13. Please see the discussion above.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1 and 13 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 1 recites the amended limitation: "from the computer storage medium to feed the tactile signals...." The specific portion "to feed" is not described, defined, or suggested in the original disclosure. Claim 13 recites "and feeding" in line 8-9, which is not explicitly described to defined in the original disclosure.

The amended portion has been examined as best understood in light of the specification.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-4, and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Simmons, US 6,741,911, in view of McIntosh, US 5,103,404, in further view of Rosenberg, "'Virtual fixtures': Perceptual overlays enhance operator performance in telepresence tasks" Stanford University, Stanford, CA, August 1994.

(Claims 1 and 13) Simmons describes a virtual reality encounter system and method comprising: a humanoid robot having tactile sensors positioned along the exterior of the robot (column 8, lines 39-50), the sensors sending tactile signals to a communications network (column 7, lines 29-32, robot contains sensors of movement and pressure, column 10, lines 49-52); and a user body suit having tactile actuators (external actuator assemble and assistive equipment, column 6, lines 33-51, column 8, lines 39-50), the actuators receiving the tactile signals from the corresponding tactile sensors on the robot from the communication network (column 7, lines 29-32), wherein the tactile sensors and the corresponding tactile actuators are calibrated in connection with variable sensitivities associated with different regions of the human (column 8, line 62- column 9, line 4, column 13, lines 3-28). Further McIntosh teaches that it was well known in the remote robotic control art to calibrate sensors to different levels of sensitivities to overcome the problem and allow, according to McIntosh, individuals to vary the sensitivities of tactile feedback to optimize their own degree of sensitivity and control over the manipulator (column 1, lines 41-50, column 9, lines 12-52). It would have been obvious to one of ordinary skill in the art at the time of the invention to calibrate the tactile actuators of the body suit, because as McIntosh suggests this would allow the user to preset and vary the sensitivities of the suit actuators in individual body

locations to the user's preferred degree of sensitivity of how to feel the remote environment. This would as Simmons suggests, allow the user to feel pressure or force that is proportional to the robot at remote locations (column 40, lines 39 -45), allowing the user's hands to feel more delicate level of sensation or allowing the user to feel superhuman, by feeling only a little of a large force (column 40, lines 19-64).

Simmons does not explicitly describe generating supplemental virtual tactile sensation signals from data retrieved from a computer storage medium to feed the tactile signals from the robot tactile sensors and the generated supplemental tactile sensation signals. However, Rosenberg teaches the use of perceptual virtual overlays in a telepresence system. Rosenberg defines perceptual overlay as "abstract sensory information overlaid on top of the reflected sensory feedback from a virtual, remote, or real environment... perceptual overlay may be composed sensory information ... including visual, auditory, **haptic, and tactile sensations**" (pg 11, section 1.8, lines 1-7). Further, "perceptual overlays are in fact virtual constructs, and **not** truly a part of the distal environment, perceptual overlays can be seen as embellishments of the user's perceptual reality" (pg 12, lines 1-2). The telepresence system includes a remotely controlled robot having force sensors (MERLIN robot arm, located in the "remote environment"); an exoskeleton having force actuators (FREFLEX upper body exoskeleton, located in the "operator space" . . . "where the human subject is interfaced to the system", figure 5.1, pg 122 and the tested embodiment of a force reflecting joystick, pg 172), a gateway device (microprocessor located at the operator space connected to the user interface exoskeleton and/or joystick, pg 77 and tested as Intel-

486 computer, section 7.1.1, pg 172); inherently the microprocessor comprises a memory; a computer storage medium storing data for generating supplemental virtual tactile sensation signals (the microprocessor comprising a software package to be executed by the computer which to run on the microprocessor would inherently require it to be stored on a computer readable medium); the microprocessor configured to execute computer instructions stored in the memory (MERLIN VME processor, section 5.4.4) configured to: retrieve data from the computer storage medium (MERLIN VME processor received input from the TASK Controller computer which fixture models should be generated; fixture models computed by the MERLIN VME, page 133, 5.4.4., lines 2-15); generating supplemental virtual tactile sensation signals from the data retrieved from the computer storage medium (virtual fixture models computed by MERLIN VME, fed to the FREFLEX VME controller, section 5.4.4, pg 133) to feed the tactile sensors and the generated supplemental tactile sensation signals to the tactile actuators to the user suit (Since "to feed" or "feeding" is not explicitly described in the original disclosure, in light of the specification the limitations have been interpreted as sending the signals. Section 5.4.4.2-5.4.4.5, the virtual fixture models are composed of mathematical models, which was used to determine the resultant force to be applied to the exoskeleton; the processor at the operator sight sends both virtual fixture signals and remote perceptual information from the remote site by overlaying the virtual fixtures directly on top of the perceptual information reflected from the remote environment, page 175, lines 1-5).

Rosenberg further teaches that the virtual fixtures may be implemented by the user by using a software package, Percept-Station, that includes a retrievable computer-program "toolbox" of virtual fixture models (abstract perceptual elements), that the user may overlay on the perceived remote environment by using associated keystrokes and menu options (pg 171, lines 14-33). The haptic sensations are produced by stored computational algorithms that are implemented by the user "choosing from among a menu of possible perceptual elements and then drawing a graphic representation of the percept at the desired location in the remote environment." (page 175, 7.1.2.4, lines 1-9.) It would have been obvious to a person of ordinary skill in the art at the time of the invention to combine the teachings of Rosenberg to the virtual reality system of Simmons in view of McIntosh because as Rosenberg suggests "by overlaying particular configurations of perceptual information on top of the reflected sensory feedback from a telepresence worksite, operator performance can be greatly enhanced in a variety of manual tasks." (Pg 12, lines 8-10.)

Rosenberg does not explicitly describe the operator's computer as a "gateway device". However, it was well known in the computer arts that a gateway can be embodied in a general computer to perform the protocol conversion or the functions that a separate gateway device (such as a router or modem) performs. It would have been very obvious to one of ordinary skill in the communication arts to utilize a general computer with an internal gateway device (internal router or modem) as the operator's computer which overlays the virtual fixtures, as this would have been merely a design choice of the network system, comprised of well known network components.

Simmons describes a user assembly comprising actuators and sensors to "apply pressure to, mobbing, or any combination thereof" (column 42, lines 17-20) and monitor the bodies and limbs of the user using body worn sensors (column 7, lines 29-40). Rosenberg teaches an exoskeleton worn by the user (Figure 5.1, page 122). Simmons and Rosenberg do not describe using a "body suit" comprising actuators "**in** the body suit". However, a body suit comprising tactile actuators located in the interior of a suit was known in the art at the time of the invention. Tremblay teaches a man-machine interface to provide tactile feedback to various sensing body parts of the user, wherein a body suit having tactile actuators (vibrotractile units "mounted inside or outside of the suit in pocket-like cavities" [0066] and Figure 10a) receive tactile signals from corresponding tactile sensors on a robot from a network (contact sensors on the robot (element 1912), are fed to the computer and sent to vibrotactile units on the user [0077]). Even if sensors and actuators are directly attached to users in the teachings of Simmons and Rosenberg, as Applicant contends, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a body suit, with actuators sewn inside or outside the suit, instead of actuators "explicitly affixed to the body" (Tremblay, [0066]) because as a Tremblay suggests the two means of transmitting haptic sensations to the user are interchangeable: vibrotactile units may be positioned affixed to the user's body or if a garment is worn, "then the units may also be **mounted inside** or outside of the suit in pocket-like cavities, and need not be explicitly affixed to the body." ([0065], figures 9, 10a, 10b, 22) The substitution of using a garment with actuators and sensors mounted inside or outside for directly placing actuators and

sensors on a user would have obtained predictable results of transmitting and receiving the same signal information.

(Claims 2 and 14) Simmons further describes motion sensors positioned throughout the body suit (column 13, lines 50-67), the motion sensors sending motion signals corresponding to movements of each sensor relative to a reference point (column 14, lines 30-41), the motion signals transmitted to the communications network (column 7, lines 29-32); and the humanoid robot, receiving, from the communications network the signals from the motion sensors (column 11, lines 15-60), the signals from the motion sensors causing a movement of the robot that is correlated to a movement of the body suit (column 8, lines 23-30).

(Claims 3 and 15) Simmons further describes wherein the robot includes actuators corresponding to the motion sensors, the actuators causing the robot to move (figure 2).

(Claim 4) Simmons describes the robot comprising a body (column 5, 40-58); a camera coupled to the body, the camera for sending video signals to the communications network (column 7, lines 2-8, column 11, lines 51-52); and suggests sending audio information to the local site over the communications network (column 11, lines 51-52) further describing that a sound sensor means is coupled to second body (robot) to capture sound for sending audio signals to the communications network (column 4, lines 20-28 and claim 49).

Claim Rejections - 35 USC § 103

Claims 5, 8, 9, 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Simmons in view of McIntosh, Rosenberg and Tremblay, as applied to claims 4 and 14 above, and further in view of Simmons US 20030030397 (Simmons '397).

(Claims 5, 8, and 16) Simmons describes wherein the user wears a "wrap around video display or a holographic display over his eyes" to render the video signals received from the camera (column 9, lines 5-10) and a transducer to transduce the audio signals received from the sound sensor coupled to the robot (claim 49, column 4, lines 20-28). Simmons '397 teaches that the robot would comprise microphones in the appropriate ear location to be relative to the ear position of the user (claim 19) and that the head display would comprise of goggles or glasses (claim 12). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Simmons '397 with the invention of Simmons, in view of McIntosh and Rosenberg, because as Simmons '397 suggests, the microphones and the goggles are one well known means of creating the 360-degree, stereoscopic, realistic feedback of the remote location ([0016]). Simmons further describes wherein the virtual reality system comprises an interface having one or more channels configured to receive the audio signals form the sound sensors (column 7, lines 29-32); receiving the video signals form the camera (column 7, lines 2-8); sending the video signals to the head display (column 9, lines 5-10); and sending the audio signals to the sound producing means (column 4, lines 20-28).

(Claims 9 and 18) Simmons further describes wherein the body includes an eye socket and the camera is positioned in the eye socket (column 7, lines 2-8).

Claim Rejections - 35 USC § 103

Claims 10 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Simmons in view of McIntosh, Rosenberg, Tremblay and Simmons '397 as applied to claims 5 and 16 above, and further in view of Algazi, US 7,333,622.

Simmons and Simmons '397 describe wherein the sound sensor is positioned on the robot relative to the position of the sound receiver on the person and can be refined by the shape of the outer ear (column 4, lines 20-28). Algazi teaches it was well known in the art to place listening devices in a mannequin having the exact size, shape, and acoustic properties of the listener located in the ear canals to replicate the sound signals accurately (column 3, lines 22-52). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Algazi with the invention of Simmons in view of McIntosh, Rosenberg, Tremblay and Simmons '397 because Algazi describes merely one means of achieving the result described by Simmons of replicating the 360 degree, precise audio feedback to the remote user.

Claim Rejections - 35 USC § 103

Claims 6, 7 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Simmons in view of McIntosh, Rosenberg, Tremblay, and Simmons '397 as applied to claims 5 and 16 above, and further in view of Abbasi, US 6,786,863.

Simmons describes a remote robot operating system and method wherein one user controls a robot that duplicates the actions of the operator and transmits the

sensed condition of the robot environment to the operator, wherein the sensed environment is overlaid visually and reproduced by actuators and sensors on the operator (column 1, line 36-column 2, line 12). Simmons does not describe wherein at the location of the operator, a second humanoid robot transmits data to a first location. However, Abbasi teaches this duplication of the same system to create an interaction between remote users is known. Abbasi teaches a remote physical contact system and method wherein a first surrogate (robot) is at a first location, a second surrogate (robot) is at a second location, the second surrogate having the same components, actuators, and sensors, i.e. a second microphone and second camera (figure 1, elements 35B, 40B, and 45B); a second display to receive the video signals from a first camera, a second earphone to receive audio signals from a first microphone (figure 1, elements 25 and figure 6), and a first gateway device in the first location and a second gateway device having a processor in the second location to create the remote interaction via a network (computer network 30 between computers 15 and 25, figure 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Abbasi with the invention of Simmons, in view of McIntosh, Rosenberg, Tremblay, and Simmons '397 , because as Abbasi teaches the use of remote surrogates and expands the notion by using dual surrogates for teleconferencing or computer communications, adding a capability to engage in all types of physical contact to "provide for the tactile sensation so inherent in many forms of human contact." (Column 1, lines 44-64.) Further the combination of the prior arts would produce a

predictable result by merely duplicating the known systems and interchanging the physical locations, as clearly suggested by Abbasi.

Claim Rejections - 35 USC § 103

Claims 11, 12, 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Simmons in view of McIntosh, Rosenberg, Tremblay, Simmons '397, and Algazi as applied to claim 10, Simmons in view of McIntosh, Rosenberg, and Temblay as applied to claim 4, and Simmons in view of McIntosh, Rosenberg, Tremblay and Simmons '397 as applied to claim 16, and in further in view of Yee, US 6,016,385.

Simmons in view of Simmons '397 describes transmitting video signals to a set of goggles but does not specify a receiver or that the data is transmitted wirelessly. However, Yee teaches a headset of a user comprises a receiver to receive video signals (column 5, lines 11-37) and wherein the robot comprises a transmitter to wirelessly send the audio, tactile, motion and video signals to the communications network (communications antenna 30). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the invention of Simmons in view of McIntosh, Rosenberg, Tremblay and Simmons '397 with the teachings of Yee because it was well known that wireless means would offer the predictable result of more accessible travel of the robot and a wider range of motion.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHRISTINE BEHNCKE whose telephone number is (571) 272-8103. The examiner can normally be reached on 8:30 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas G. Black can be reached on (571) 272-6956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CMB

/Thomas G. Black/
Supervisory Patent Examiner, Art Unit 3661